

Cetacean Surveys of Guam and CNMI Waters: June – July, 2013
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Suggested citation:

Hill M.C., A.D. Ligon, M.H. Deakos, A.C. Ü, and E.M. Oleson. 2013. Cetacean Surveys of Guam and CNMI Waters: June – July, 2013. Prepared for the U.S. Pacific Fleet Environmental Readiness Office. PIFSC Data Report DR-13-019. 21 pp.

Mission

The Pacific Islands Fisheries Science Center's (PIFSC) Cetacean Research Program (CRP) conducted surveys for cetaceans in the waters surrounding Guam and the Commonwealth of the Northern Mariana Islands (CNMI) in an effort to further develop a record of cetacean occurrence in the region.¹ This was the fourth year conducting cetacean surveys aboard small boats (7.6 – 12.2 m) around the southern Mariana Islands of Guam, Rota, Saipan, Tinian, and Aguijan (Fig. 1). This project was carried out in partnership with the Commander, U.S. Pacific Fleet by a team of four primary personnel (Table 1). The collected data are being used to reveal the occurrence and distribution, stock structure, and movements of cetaceans within the study area.

Methods

The surveys were conducted on chartered vessels in the waters surrounding Guam, Rota, Saipan, Tinian, and Aguijan between 22 June and 27 July 2013 (Table 2). Surveys were conducted off of Guam aboard two different vessels, the *Lucky Strike* and *Pro-Line 25* (Table 3). Surveys were conducted off of Rota aboard two different vessels, the *Sr. Dung* and *Nacrina* (Table 3). Surveys were conducted off of Saipan, Tinian, and Aguijan aboard two different vessels, the *Sea Hunter* and *Regulator* (Table 3).

Survey effort was designed to cover representative habitat within the study area and did not conform to systematic (i.e., line-transect) design. Vessel tracks were spread out from day to day to ensure representative survey coverage of the study area, particularly over a wide range of depths, and were also dictated by weather and sea conditions. The survey vessels traveled at a speed of 8-12 knots, depending on the size of the vessel and sea conditions. Between 4 and 5 observers scanned for marine mammals with unaided eye or the occasional use of 7× and 10× binoculars, collectively searching 360-degrees around the vessel. On occasion, individuals from the Pacific Islands Fisheries Science Center, Guam Department of Agriculture's Division of Aquatic and Wildlife Resources, Saipan local field office of the Pacific Islands Regional Office, and CNMI Department of Fish and Wildlife accompanied the primary observer team.

All cetacean groups encountered were approached for species confirmation, group-size estimates, photo-identification, biopsy sampling (for assessment of genetic population structure) when possible, and satellite tags (Wildlife Computers SPOT5) were deployed on individuals of certain species to investigate their movements¹. Digital SLR cameras with telephoto zoom lenses were used for taking photographs. Photographic efforts were focused on dorsal fin images (for individual identification purposes) and images of the body and head (for assessments of health and scarring). Biopsy sampling was conducted using a Barnett RX-150 crossbow and Ceta-Dart bolts with sterilized, stainless steel biopsy tips (25 mm long × 8 mm diameter). Tissue samples were preserved in a cooler on ice while on the boat. Samples were split in half longitudinally at the end of each field day (with each subsample stored in a different vial) and transferred to a standard refrigerator freezer until the end of the project. Samples were

¹ All operations were conducted under NMFS permit 15240 and CNMI-DFW permit, license no. 02694-13. Funding was provided by the NOAA Fisheries and the U.S. Pacific Fleet.

transported, in a cooler with dry ice, on board a commercial airline to Honolulu, HI, USA. One vial of each sample is stored in an - 80°C freezer at the Pacific Islands Fisheries Science Center (Honolulu, HI, USA), and the other was submitted (via PIFSC) to the Southwest Fisheries Science Center (SWFSC, La Jolla, CA, USA) for tissue archiving. Samples are archived until adequate numbers are available to assess stock structure or until funding is provided to address other specific questions.

Additional data collected during each sighting included the location, behavior, best estimates of the number of neonates and young of the year (YOY) (when possible), Beaufort sea state, and swell height. Environmental data (e.g., Beaufort sea state, swell height) and effort status were recorded regularly as conditions changed. Global Positioning System (GPS) readings of the vessel's track were automatically recorded once per minute. The occurrences and locations of turtles were recorded but neither photos nor biological samples were collected.

Results

Surveys were conducted during 30 days (Guam: 10 d, Rota: 6 d, Saipan/Tinian/Aguijan: 14 d), and a total of 3208 km of trackline were surveyed (Table 4, Figs. 2-4). There were a total of 42 sightings of 8 cetacean species (bottlenose dolphin, false killer whale, pantropical spotted dolphin, pygmy killer whale, rough-toothed dolphin, short-finned pilot whale, sperm whale, and spinner dolphin) (Table 5, Figs. 5-7). Three of the sightings were mixed species groups of pilot whales and bottlenose dolphins; false killer whales and bottlenose dolphins; and rough-toothed dolphins, bottlenose dolphins, and spinner dolphins. More than 18,500 photos were taken (Table 5). A total of 76 biopsy samples were collected during 28 sightings of the 8 cetacean species and 8 sloughed skin samples were collected from sperm whales (Table 5). The biopsy samples are currently being processed. Ten satellite tags were deployed (2 bottlenose dolphins, 4 false killer whales, 1 rough-toothed dolphin and 3 short-finned pilot whales) (Table 5-6 and Figures 8-10). Two of the satellite tags (1 short-finned pilot whale and 1 false killer) continue to transmit as of 17 December 2013. A total of 68 turtles were observed (Table 7).

Acknowledgements

We would like to thank our boat owners, captains and crews: John Eads, Julie and Jason Hartup, Fidel Mendiola Jr., Ignacio Lizama, Cris Ayuyu, Sam Markos, Ben Sablan, Hideyuki Kaya, and Alphonsus Ngirmeriil. We would also like to thank all of the volunteers that assisted with the surveys and logistical support for this project. This includes: Eric Cruz (PIFSC-Guam), Valerie Brown (PIRO-Guam), Brent Tibbats (Guam DAWR), Mark & Lynne Michaels (Dive Rota), Todd Miller, Mike Tenorio, Manny Pangelinan, Tyler Willsey and Jill Peiffer (CNMI Fish and Wildlife), Mike Trianni (PIFSC-CNMI), Steve McKagan and Dana Okano (CNMI-PIRO), and Erik Norris (PIFSC- Honolulu).

Table 1.-- Personnel, roles, and organizations.

Name	Role	Organization
Marie Hill	Chief Scientist/Marine Mammal Observer	Joint Institute for Marine and Atmospheric Research
Allan Ligon	Logistics coordinator/Marine Mammal Observer	Contractor
Mark Deakos	Marine Mammal Observer	Contractor
Adam Ü	Marine Mammal Observer	Contractor
Erin Oleson*	Marine Mammal Observer	Pacific Islands Fisheries Science Center

*Participated in surveys off Saipan, Tinian, in Aguijan (see Table 2).

Table 2.-- Mission schedule, locations, and personnel.

Dates	Location	Personnel
22 June – 01 July	Guam	Deakos, Hill, Ligon, Ü
04 – 10 July	Rota	Deakos, Hill, Ligon, Ü
12 – 27 July	Saipan-Tinian-Aguijan	Deakos, Hill, Ligon, Oleson*, Ü

*Participated in surveys 14-21 July.

Table 3. --Vessel used during cetaceans in the waters surrounding Guam, Rota, Saipan, Tinian, and Aguijan (22 June – 27 July 2013).

Vessel Name	Vessel Description
<i>Lucky Strike</i>	9.4-m Bertram Sport Fisherman with flying bridge and twin-diesel inboard engines
<i>Pro-Line 25</i>	7.6-m Pro-Line with a 4-stroke outboard engine
<i>Sr. Dung</i>	12.2-m Ocean Alexander Sport-fisher with flying bridge and twin-diesel inboard engines
<i>Nacrina</i>	6.7-m Boston Whaler with twin 4-stroke outboard engines
<i>Sea Hunter</i>	12.2-m sport-fisher with flying bridge and twin-diesel inboard engines
<i>Regulator</i>	7.9-m Regulator with twin 4-stroke outboard engines

Table 4.--Summary of surveys for cetaceans in the waters surrounding Guam, Rota, Saipan, Tinian, and Aguijan (22 June – 27 July 2013).

Date (2013)	Location	Survey Description	On Effort Distance (km)	On Effort Time (h:mm)
22 Jun	Guam	Apra Harbor north along shore then zig-zag south	122.8	5:49
23 Jun	Guam	Apra Harbor south zig zag to Cocos then north along shore	111.7	6:15
24-Jun	Guam	Hagåtña north along 300 ftn line to wave buoy then south past Ledge Buoy and in near Buoy 1	74.3	5:04
25 Jun	Guam	Hagåtña south to 11 Mile Reef	129.3	9:51
26 Jun	Guam	Hagåtña north along 200 ftn contour to Ritidian Pt. out to ledge and back in to FAD Buoy 1	71	5:01
27 Jun	Guam	Hagåtña west ~ 10 nmi south to Apra Harbor	45.2	3:08
28 Jun	Guam	Hagåtña to Rota Bank	122.3	8:51
29 Jun	Guam	Apra Harbor south around Cocos to Inarajan Bay out and back to SW side	162.6	7:10

Date (2013)	Location	Survey Description	On Effort Distance (km)	On Effort Time (h:mm)
30 Jun	Guam	Apra Harbor north around Ritidian Pt. to “spinner bay” (NE side)	142.6	10:26
1 Jul	Guam	Apra Harbor north offshore then in to Double Reef—south tight along shore to Agat	105.3	6:44
4 Jul	CNMI-Rota	Rota West Harbor (Song Song Harbor) out and around to Sasanhaya Bay then NE along west shore and back	63.1	2:55
5 Jul	CNMI-Rota	Rota circumnavigation counterclockwise at 3 nmi distance	121.3	8:42
6 Jul	CNMI-Rota	Rota N following false killer whales 12 nmi offshore	87.8	9:29
7 Jul	CNMI-Rota	Rota counterclockwise circumnavigation along shore then out to west	106.1	8:48
9 Jul	CNMI-Rota	Rota NW side—circuit ~ 1 nmi from shore then out to 5 nmi	75.1	7:02
10 Jul	CNMI-Rota	Rota west then inshore along NW coast	55.1	3:27
12 Jul	CNMI-Saipan	Saipan clockwise circumnavigation along shore	92.6	7:36
13 Jul	CNMI-Saipan/Tinian	Saipan and Tinian west sides out to Coke Reef and FADs (GG, FF, HH)	113.3	7:09
14 Jul	CNMI-Saipan/Tinian	Tinian NW to Saipan NW	118.7	7:30
15 Jul	CNMI-Saipan/Tinian/Aguijan	West side off islands approximately 4-5 nmi around Aguijan then nearshore along Tinian west side	130.4	8:37
17 Jul	CNMI-Saipan	Zig-zags off Saipan west side	143.4	9:27
18 Jul	CNMI-Saipan/Marpi Reef	Saipan west to Marpi Reef	110.3	7:58
19 Jul	CNMI-Saipan/Tinian/Esmeralda Bank	Saipan-Tinian west out to Esmeralda Bank	149.3	9:22
20 Jul	CNMI-Saipan	Saipan west out to 300 Reef	82.9	5:42
21 Jul	CNMI-Saipan/Tinian	Tinian counterclockwise circumnavigation 3–6 nmi offshore	124.4	8:05
23 Jul	CNMI-Saipan	Saipan NW circuit offshore	99	8:29
24 Jul	CNMI-Saipan/Tinian	Tinian clockwise circumnavigation—alongshore on east side and SW side to offshore on NW	124.4	8:43
25 Jul	CNMI-Saipan/Tinian	Saipan-Tinian west circuit offshore	105.4	5:52
26 Jul	CNMI-Saipan/Tinian	Tinian west side	87.8	4:55
27 Jul	CNMI-Saipan/Tinian/Aguijan	Saipan-Tinian west side to Aguijan north side	130.4	8:32
Total:			3207.9	216:39

Table 5.--Details of the cetacean sightings (22 June–27 July 2013). A neonate was defined as a newborn calf with fetal folds showing. A YOY (Young Of the Year) was defined as a calf $\leq \frac{1}{2}$ the size of an adult. *Sloughed skin samples were collected from sperm whales only.

Date (2013)	Sight No.	Species (Scientific)	Species (Common)	Time Begin (GMT +10)	Time End (GMT +10)	Location	Latitude	Longitude	Best Group Size Estimate	Best No. YOY	Best No. Neonates	No. Photos	No. Biopsy / Skin* Samples	No. Satellite Tag Deployed
22 Jun	1	<i>Pseudorca crassidens</i>	False killer whale	11:52	12:52	Guam	13.5310	144.6114	4	1	0	28	0	0
23 Jun	2	<i>Stenella longirostris</i>	Spinner dolphin	10:56	12:08	Guam	13.4007	144.6595	25	0	0	520	0	0
25 Jun	3	<i>Stenella attenuata</i>	Pantropical spotted dolphin	7:12	8:20	Guam	13.5018	144.6131	19	0	0	155	3	0
25 Jun	4	<i>Feresa attenuata</i>	Pygmy killer whale	14:11	15:05	Guam	13.4744	144.6402	8	0	0	578	4	0
28 Jun	5	<i>Stenella longirostris</i>	Spinner dolphin	6:05	6:31	Guam	13.4845	144.7543	20	0	0	381	0	0
30 Jun	6a	<i>Tursiops truncatus</i>	Bottlenose dolphin	6:13	9:34	Guam	13.4823	144.6507	8	0	0	67	0	0
30 Jun	6b	<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	6:20	8:14	Guam	13.4847	144.6589	29	0	1	1004	2	1
30 Jun	6c	<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	8:19	9:15	Guam	13.5526	144.7137	4	0	0	379	2	1
30 Jun	7	<i>Stenella longirostris</i>	Spinner dolphin	10:52	11:09	Guam	13.6514	144.8784	4	0	0	95	1	0
30 Jun	8	<i>Stenella longirostris</i>	Spinner dolphin	11:27	12:16	Guam	13.6140	144.9079	34	0	0	109	0	0
30 Jun	8-resight	<i>Stenella longirostris</i>	Spinner dolphin	14:31	14:55	Guam	13.6097	144.9090	34	0	0	312	0	0
30 Jun	9	<i>Stenella longirostris</i>	Spinner dolphin	12:53	14:06	Guam	13.5673	144.9506	55	0	1	432	3	0
30 Jun	10	<i>Stenella attenuata</i>	Pantropical spotted dolphin	16:02	16:23	Guam	13.4899	144.6537	11	0	0	157	1	0

Date (2013)	Sight No.	Species (Scientific)	Species (Common)	Time Begin (GMT +10)	Time End (GMT +10)	Location	Latitude	Longitude	Best Group Size Estimate	Best No. YOY	Best No. Neonates	No. Photos	No. Biopsy / Skin* Samples	No. Satellite Tag Deployed
1 Jul	11	<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	12:54	14:58	Guam	13.4023	144.6097	17	0	0	1179	5	1
5 Jul	12	<i>Stenella attenuata</i>	Pantropical spotted dolphin	6:35	7:34	Rota	14.2057	145.1323	4	0	0	48	1	0
5 Jul	12-resight	<i>Stenella attenuata</i>	Pantropical spotted dolphin	7:50	8:41	Rota	14.1293	145.0591	10	0	0	128	6	0
5 Jul	13	<i>Stenella attenuata</i>	Pantropical spotted dolphin	10:19	10:54	Rota	14.0657	145.2172	6	0	0	60	3	0
6 Jul	14a	<i>Pseudorca crassidens</i>	False killer whale	6:03	12:42	Rota	14.1405	145.1260	17	0	0	2161	9	3
6 Jul	14b	<i>Tursiops truncatus</i>	Bottlenose dolphin	6:05	12:43	Rota	14.1405	145.1260	2	0	0	3	0	0
6 Jul	15	<i>Stenella attenuata</i>	Pantropical spotted dolphin	14:25	15:09	Rota	14.2132	145.1377	35	1	0	322	4	0
7 Jul	16	<i>Stenella longirostris</i>	Spinner dolphin	8:18	9:54	Rota	14.1673	145.2878	60	0	0	392	3	0
7 Jul	17	<i>Pseudorca crassidens</i>	False killer whale	11:22	14:39	Rota	14.1143	145.0680	15	0	0	1162	7	1
9 Jul	18	<i>Stenella longirostris</i>	Spinner dolphin	6:10	6:28	Rota	14.1389	145.1287	14	0	0	34	0	0
9 Jul	19	<i>Tursiops truncatus</i>	Bottlenose dolphin	6:28	8:30	Rota	14.1470	145.1375	12	0	0	805	1	0
9 Jul	20	<i>Stenella attenuata</i>	Pantropical spotted dolphin	8:57	10:02	Rota	14.2205	145.2305	50	1	0	621	0	0
10 Jul	21	<i>Tursiops truncatus</i>	Bottlenose dolphin	10:47	11:53	Rota	14.1976	145.2267	8	0	0	337	0	0

Date (2013)	Sight No.	Species (Scientific)	Species (Common)	Time Begin (GMT +10)	Time End (GMT +10)	Location	Latitude	Longitude	Best Group Size Estimate	Best No. YOY	Best No. Neonates	No. Photos	No. Biopsy / Skin* Samples	No. Satellite Tag Deployed
12 Jul	22	<i>Stenella longirostris</i>	Spinner dolphin	6:52	7:55	Saipan	15.2661	145.7792	25	0	0	538	2	0
12 Jul	23	<i>Stenella longirostris</i>	Spinner dolphin	8:25	9:20	Saipan	15.2725	145.8340	40	0	0	406	3	0
12 Jul	24	<i>Stenella longirostris</i>	Spinner dolphin	11:08	12:03	Saipan	15.1164	145.7585	25	0	0	313	1	0
13 Jul	25	<i>Stenella attenuata</i>	Pantropical spotted dolphin	10:00	10:29	Tinian	15.1438	145.4633	30	0	0	58	0	0
13 Jul	26	<i>Stenella longirostris</i>	Spinner dolphin	12:13	12:50	Saipan	15.2283	145.7057	25	0	0	565	0	0
14 Jul	27	<i>Stenella longirostris</i>	Spinner dolphin	6:13	6:46	Saipan	15.2054	145.6808	14	0	0	45	0	0
15 Jul	28	<i>Stenella longirostris</i>	Spinner dolphin	9:40	10:21	Aguijan	14.8625	145.5803	25	1	0	463	0	0
15 Jul	29a	<i>Tursiops truncatus</i>	Bottlenose dolphin	10:21	11:50	Aguijan	14.8576	145.5831	11	0	0	123	0	1
15 Jul	29b	<i>Steno bredanensis</i>	Rough-toothed dolphin	10:22	11:49	Aguijan	14.8567	145.5820	6	0	0	297	1	1
15 Jul	29c	<i>Stenella longirostris</i>	Spinner dolphin	10:35	11:00	Aguijan	14.8606	145.5827	2	0	0	9	0	0
17 Jul	30	<i>Tursiops truncatus</i>	Bottlenose dolphin	12:29	13:32	Saipan	15.2505	145.7060	3	0	0	132	1	0
17 Jul	31	<i>Tursiops truncatus</i>	Bottlenose dolphin	13:49	14:58	Saipan	15.2041	145.6968	6	0	0	447	3	1
18 Jul	32	<i>Stenella longirostris</i>	Spinner dolphin	8:42	9:03	Marpi Reef	15.4197	145.8687	8	1	0	15	0	0
18 Jul	33	<i>Stenella longirostris</i>	Spinner dolphin	9:20	9:59	Marpi Reef	15.4135	145.8752	65	2	0	279	0	0
18 Jul	33-resight	<i>Stenella longirostris</i>	Spinner dolphin	10:53	11:43	Marpi Reef	15.4315	145.8867	55	1	0	337	0	0

Date (2013)	Sight No.	Species (Scientific)	Species (Common)	Time Begin (GMT +10)	Time End (GMT +10)	Location	Latitude	Longitude	Best Group Size Estimate	Best No. YOY	Best No. Neonates	No. Photos	No. Biopsy / Skin* Samples	No. Satellite Tag Deployed
19 Jul	34	<i>Stenella longirostris</i>	Spinner dolphin	6:31	7:08	Saipan	15.2179	145.6702	7	0	0	239	1	0
20 Jul	35	<i>Steno bredanensis</i>	Rough-toothed dolphin	17:17	17:52	Saipan	15.2340	145.6200	4	0	0	299	1	0
21 Jul	36	<i>Stenella longirostris</i>	Spinner dolphin	7:09	7:37	Saipan	15.2104	145.6957	17	0	0	511	0	0
21 Jul	37	<i>Stenella longirostris</i>	Spinner dolphin	14:17	14:42	Saipan	15.1734	145.6914	17	0	0	44	0	0
23 Jul	38	<i>Physeter macrocephalus</i>	Sperm whale	6:54	11:10	Saipan	15.3423	145.5861	8	0	0	213	1/8*	0
23 Jul	39	<i>Tursiops truncatus</i>	Bottlenose dolphin	12:32	13:25	Saipan	15.2989	145.7068	5	0	0	200	1	0
24 Jul	40	<i>Stenella longirostris</i>	Spinner dolphin	6:30	7:11	Saipan	15.1923	145.6830	30	0	0	404	1	0
24 Jul	41	<i>Stenella longirostris</i>	Spinner dolphin	8:35	9:42	Tinian	14.9912	145.6727	45	0	0	664	4	0
27 Jul	42	<i>Stenella longirostris</i>	Spinner dolphin	8:58	10:16	Aguijan	14.8593	145.5817	40	1	0	449	1	0
Total:												18519	84	10

Table 6. – Summary of satellite tags deployed during surveys for cetaceans in the waters surrounding Guam, Rota, Saipan, Tinian, and Aguijan (22 June – 27 July 2013).

Tag ID	Species	Location	Deployment Date/Time (GMT +10)	Deployment Date/Time (GMT)	Last Transmission Date/Time (GMT)	Duration (Days)
128884	Short-finned pilot whale	Guam	6/30/2013 7:08	6/29/2013 21:08	7/17/2013 18:46	17.9
128885	Short-finned pilot whale	Guam	6/30/2013 8:46	6/29/2013 22:46	9/1/2013 23:44	64
128886*	Short-finned pilot whale	Guam	7/1/2013 13:20	7/1/2013 3:20	12/17/2013 23:27	168.8
128896	Rough-tooth dolphin	Aguijan	7/15/2013 10:33	7/15/2013 0:33	7/26/2013 18:16	11.7
128897	Bottlenose dolphin	Aguijan	7/15/2013 10:52	7/15/2013 0:52	8/4/2013 12:26	20.5
128898	Bottlenose dolphin	Saipan	7/17/2013 14:06	7/17/2013 4:06	7/25/2013 23:26	8.8
128903	False killer whale	Rota	7/6/2013 9:06	7/5/2013 23:06	7/9/2013 23:54	4
128904	False killer whale	Rota	7/6/2013 9:26	7/5/2013 23:26	7/28/2013 6:39	22.3
128906	False killer whale	Rota	7/6/2013 11:06	7/6/2013 1:06	10/12/2013 23:42	98.9
128908*	False killer whale	Rota	7/7/2013 11:42	7/7/2013 1:42	12/17/2013 23:27	162.9

*Satellite tags still transmitting.

Table 7.--Turtle sightings (22 June–27 July 2013). The locations listed are those of the vessel. Turtles were not approached for more precise locations.

Date (2013)	Time (GMT+10)	Island	Latitude	Longitude	Description
22-Jun	8:26	Guam	13.5172	144.7966	Turtle-large (> 2.5 ft)
23-Jun	10:36	Guam	13.3537	144.6375	Green Turtle-med (1.5–2.5 ft)
23-Jun	10:49	Guam	13.3887	144.6495	Turtle-med (1.5–2.5 ft)
23-Jun	10:52	Guam	13.3958	144.6547	Green Turtle-med (1.5–2.5 ft)
23-Jun	12:16	Guam	13.4062	144.6576	Turtle-med (1.5–2.5 ft)
24-Jun	11:19	Guam	13.4852	144.7518	Turtle-med (1.5–2.5 ft)
28-Jun	6:33	Guam	13.4929	144.7625	Turtle-med (1.5–2.5 ft)
29-Jun	10:39	Guam	13.2879	144.6476	Green Turtle-large (> 2.5 ft)
30-Jun	10:44	Guam	13.6585	144.8586	Turtle-med (1.5–2.5 ft)
30-Jun	10:45	Guam	13.6590	144.8602	Turtle-med (1.5–2.5 ft)
30-Jun	11:22	Guam	13.6261	144.9002	Green Turtle-small (< 1.5 ft)
30-Jun	12:34	Guam	13.5996	144.9578	Green Turtle-med (1.5–2.5 ft)
30-Jun	14:27	Guam	13.6082	144.9087	Green Turtle-small (< 1.5 ft)
1-Jul	8:53	Guam	13.4573	144.6183	Green Turtle-med (1.5–2.5 ft)
7-Jul	8:12	Rota	14.1547	145.2754	Turtle-med (1.5–2.5 ft)
7-Jul	8:13	Rota	14.1555	145.2771	Turtle-med (1.5–2.5 ft)

Date (2013)	Time (GMT+10)	Island	Latitude	Longitude	Description
7-Jul	10:32	Rota	14.1776	145.1919	Turtle-med (1.5–2.5 ft)
10-Jul	12:52	Rota	14.1363	145.1332	Turtle-med (1.5–2.5 ft)
12-Jul	8:09	Saipan	15.2906	145.8090	Turtle-small (< 1.5 ft)
12-Jul	8:13	Saipan	15.2874	145.8174	Green Turtle-med (1.5–2.5 ft)
12-Jul	8:55	Saipan	15.2694	145.8340	Green Turtle-med (1.5–2.5 ft)
12-Jul	9:20	Saipan	15.2675	145.8324	Green Turtle-large (> 2.5 ft)
12-Jul	9:25	Saipan	15.2616	145.8298	Turtle-med (1.5–2.5 ft)
12-Jul	9:27	Saipan	15.2592	145.8282	Turtle-med (1.5–2.5 ft)
12-Jul	9:27	Saipan	15.2585	145.8261	Turtle-med (1.5–2.5 ft)
12-Jul	9:42	Saipan	15.2358	145.8065	Turtle-med (1.5–2.5 ft)
12-Jul	13:22	Saipan	15.2052	145.6986	Turtle-med (1.5–2.5 ft)
13-Jul	12:05	Saipan	15.2187	145.6884	Green Turtle-med (1.5–2.5 ft)
13-Jul	12:05	Saipan	15.2194	145.6893	Green Turtle-med (1.5–2.5 ft)
13-Jul	12:15	Saipan	15.2280	145.7046	Green Turtle-med (1.5–2.5 ft)
13-Jul	12:53	Saipan	15.2169	145.6914	Turtle-med (1.5–2.5 ft)
13-Jul	13:07	Saipan	15.2265	145.7194	Green Turtle-small (< 1.5 ft)
14-Jul	14:09	Saipan	15.2270	145.6983	2× Green Turtle-med (1.5–2.5 ft)
15-Jul	5:58	Saipan	15.2273	145.7181	Green Turtle-med (1.5–2.5 ft)
15-Jul	14:21	Saipan	15.2257	145.7019	Green Turtle-med (1.5–2.5 ft)
15-Jul	14:32	Saipan	15.2238	145.7227	Green Turtle-med (1.5–2.5 ft)
17-Jul	13:36	Saipan	15.2077	145.6831	Green Turtle-med (1.5–2.5 ft)
17-Jul	15:19	Saipan	15.2044	145.6991	Green Turtle-med (1.5–2.5 ft)
17-Jul	15:20	Saipan	15.2088	145.7002	Green Turtle-med (1.5–2.5 ft)
18-Jul	14:08	Saipan	15.2273	145.7200	Green Turtle-med (1.5–2.5 ft)
19-Jul	15:20	Saipan	15.2258	145.6988	Green Turtle-med (1.5–2.5 ft)
19-Jul	15:22	Saipan	15.2269	145.7033	Green Turtle-med (1.5–2.5 ft)
19-Jul	15:29	Saipan	15.2261	145.7206	Turtle-med (1.5–2.5 ft)
20-Jul	12:51	Saipan	15.2274	145.6953	Turtle-small (< 1.5 ft)
20-Jul	18:20	Saipan	15.2274	145.6976	Green Turtle-med (1.5–2.5 ft)
21-Jul	7:03	Saipan	15.2275	145.7041	2×Turtle-med (1.5–2.5 ft)
21-Jul	7:04	Saipan	15.2260	145.7008	Turtle-small (< 1.5 ft)
21-Jul	7:05	Saipan	15.2249	145.6999	Turtle-small (< 1.5 ft)
21-Jul	7:06	Saipan	15.2215	145.6982	Turtle-med (1.5–2.5 ft)
21-Jul	7:40	Saipan	15.2059	145.6954	Turtle-med (1.5–2.5 ft)
21-Jul	14:50	Saipan	15.1919	145.6954	Turtle-small (< 1.5 ft)
23-Jul	13:58	Saipan	15.2285	145.6849	Turtle-med (1.5–2.5 ft)
24-Jul	6:11	Saipan	15.2223	145.7232	Green Turtle-large (> 2.5 ft)
24-Jul	6:19	Saipan	15.2184	145.6969	Turtle-med (1.5–2.5 ft)
24-Jul	6:20	Saipan	15.2164	145.6962	Green Turtle-large (> 2.5 ft)
24-Jul	6:22	Saipan	15.2109	145.6939	Turtle-med (1.5–2.5 ft)
24-Jul	14:34	Saipan	15.2196	145.6913	Green Turtle-large (> 2.5 ft)
25-Jul	11:35	Saipan	15.2225	145.6960	Turtle-small (< 1.5 ft)
25-Jul	11:45	Saipan	15.2255	145.7204	Green Turtle-med (1.5–2.5 ft)
26-Jul	10:50	Saipan	15.2234	145.6936	Turtle-med (1.5–2.5 ft)

Date (2013)	Time (GMT+10)	Island	Latitude	Longitude	Description
26-Jul	10:51	Saipan	15.2254	145.6964	Green Turtle-med (1.5–2.5 ft)
26-Jul	10:52	Saipan	15.2260	145.6983	Turtle-med (1.5–2.5 ft)
26-Jul	10:54	Saipan	15.2273	145.7035	Green Turtle-med (1.5–2.5 ft)
26-Jul	10:56	Saipan	15.2277	145.7080	Turtle-med (1.5–2.5 ft)
26-Jul	10:59	Saipan	15.2276	145.7163	Green Turtle-med (1.5–2.5 ft)
27-Jul	6:00	Saipan	15.2262	145.7209	Green Turtle-med (1.5–2.5 ft)

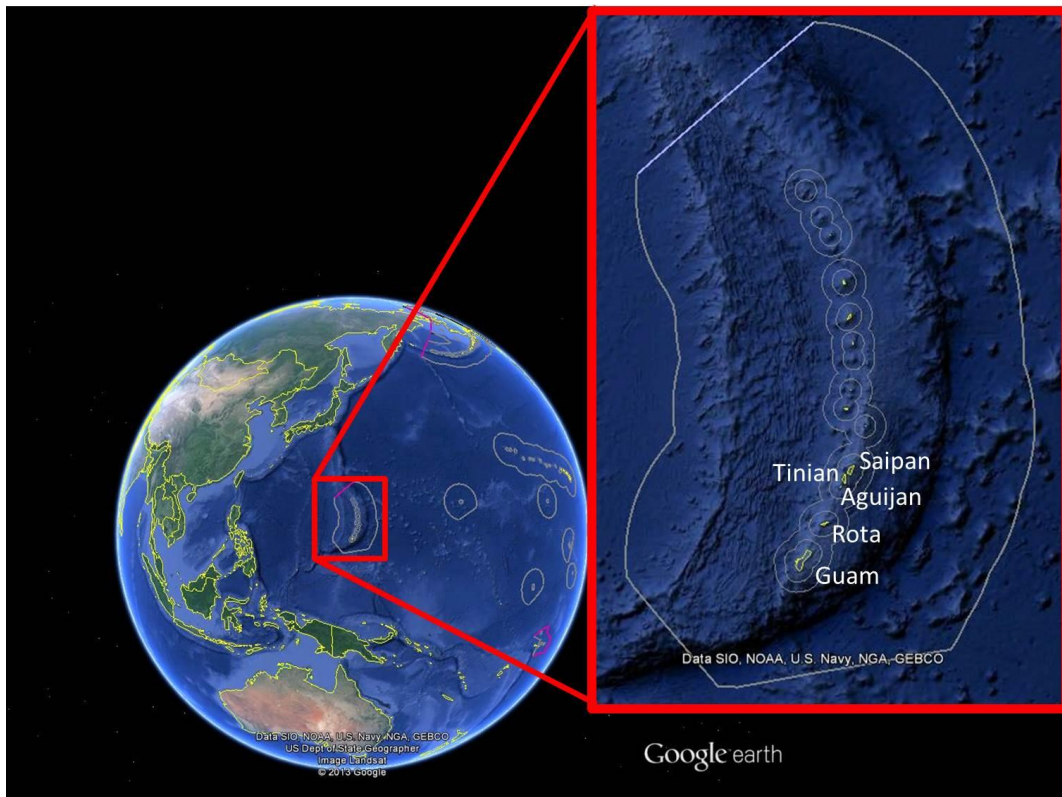


Figure 1.--Guam and The Commonwealth of the Northern Mariana Islands Exclusive Economic Zone (CNMI EEZ; outer grey line within the red box) and the survey area within the southern Mariana Islands.

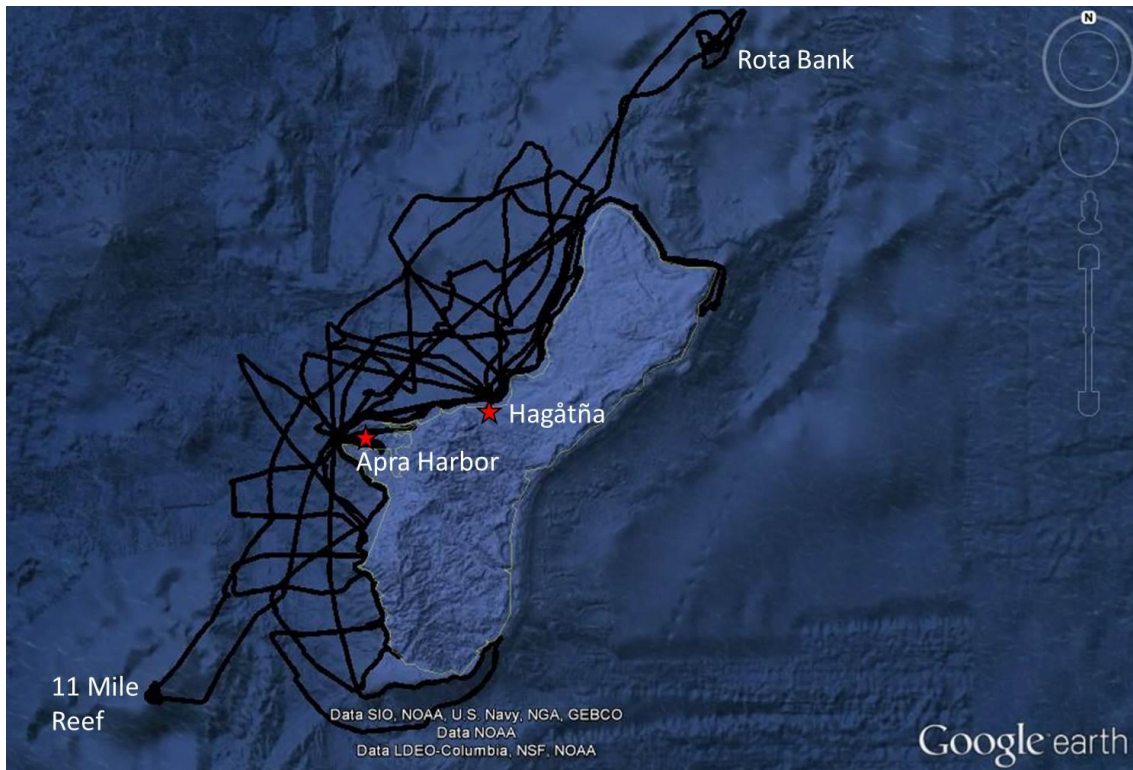


Figure 2.--Guam survey tracklines (22 June – 01 July 2013). *Lucky Strike* departed from Hagåtña Boat Basin and the *Pro-Line 25* departed from Apra Harbor.

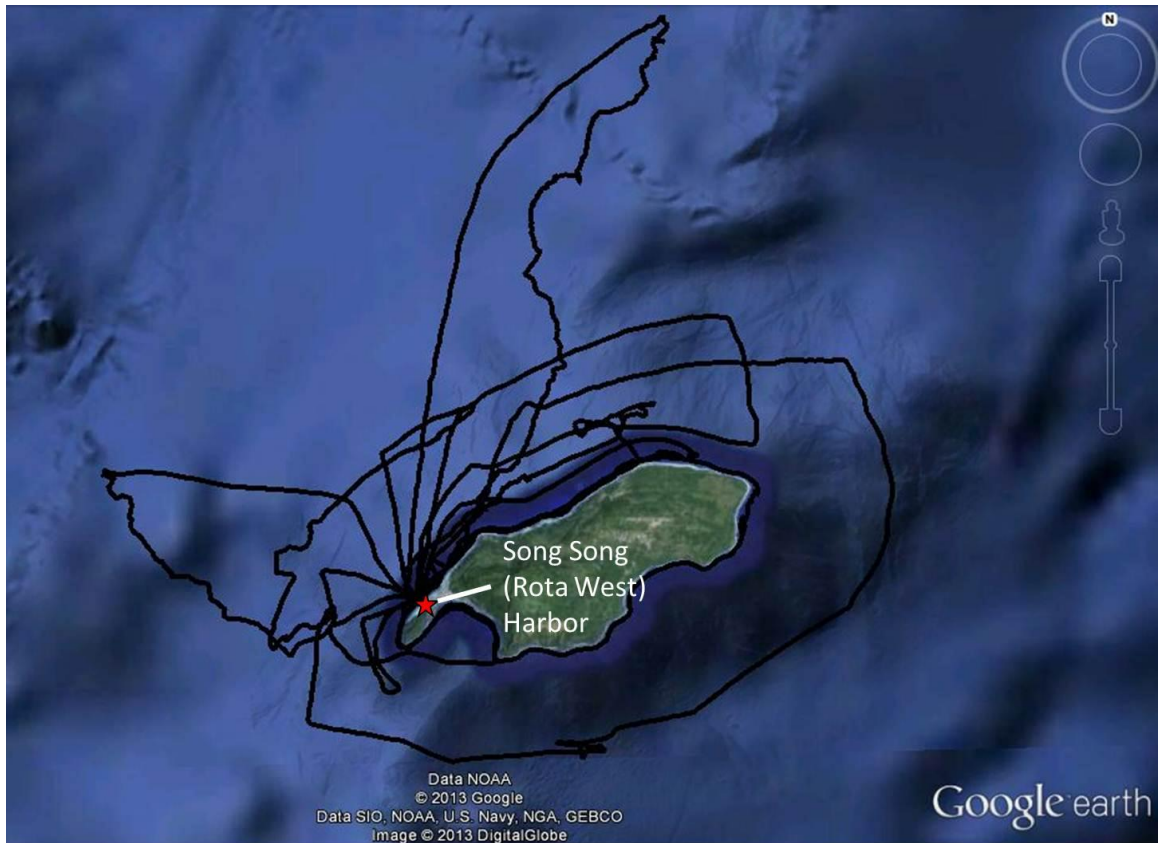


Figure 3.--Survey tracklines around Rota (4-10 July 2013). Both survey vessels departed from Song Song Harbor.

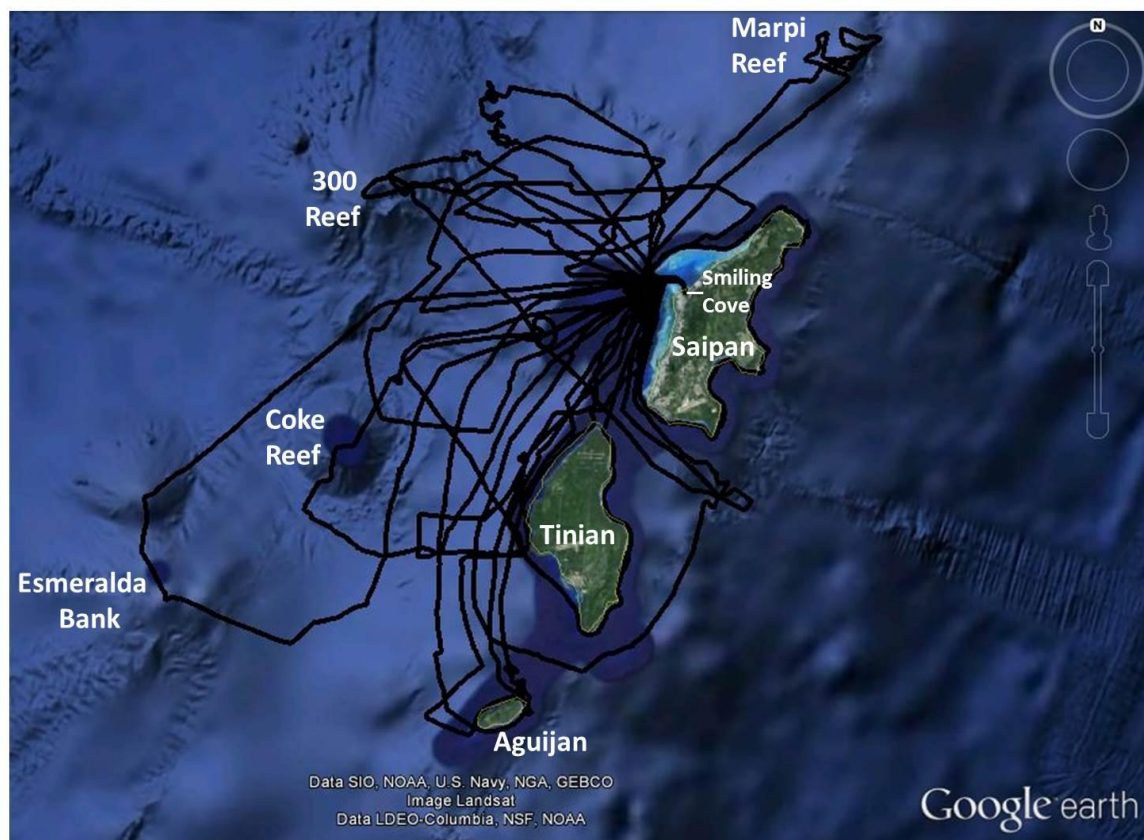


Figure 4.--Survey tracklines around Saipan, Tinian, and Aguijan (12-27 July 2013). Both survey vessels departed from the Smiling Cove Small Boat Marina on Saipan.

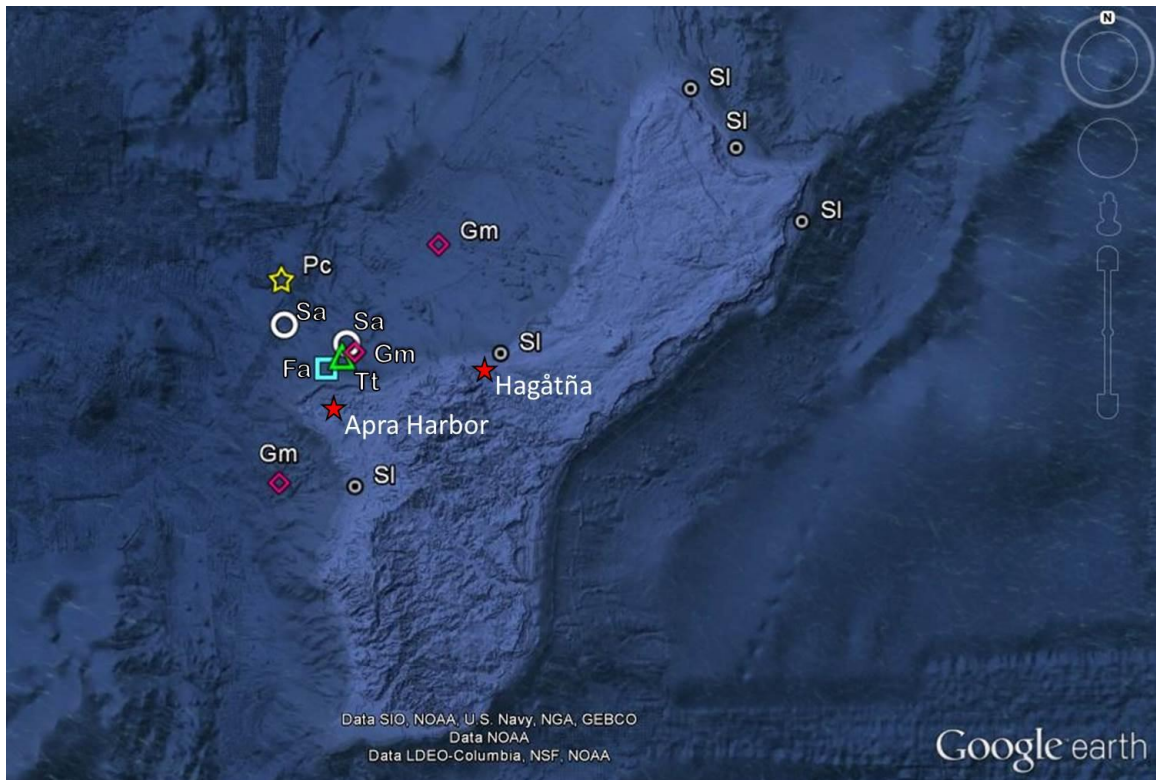


Figure 5.--Locations of cetacean sightings around Guam (22 June - 01 July 2013). Fa- *Feresa attenuata* (pygmy killer whales), Gm- *Globicephala macrorhynchus* (short-finned pilot whale), Pc- *Pseudorca crassidens* (false killer whale), Sa- *Stenella attenuata* (pantropical spotted dolphin), Sl- *Stenella longirostris* (spinner dolphin), Tt- *Tursiops truncatus* (bottlenose dolphin).

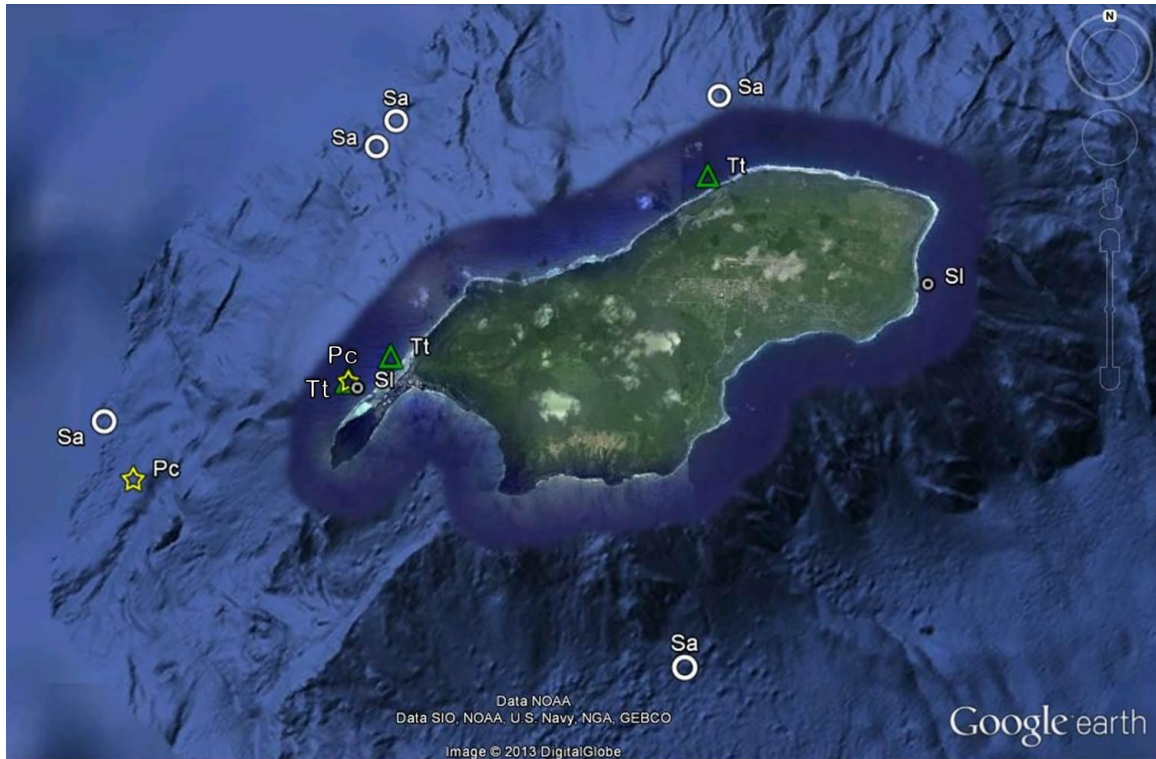


Figure 6.--Locations of cetacean sightings around Rota (5-10 July 2013). Pc- *Pseudorca crassidens* (false killer whale), Sa-*Stenella attenuata* (pantropical spotted dolphin), Sl-*Stenella longirostris* (spinner dolphin), Tt-*Tursiops truncatus* (bottlenose dolphin).

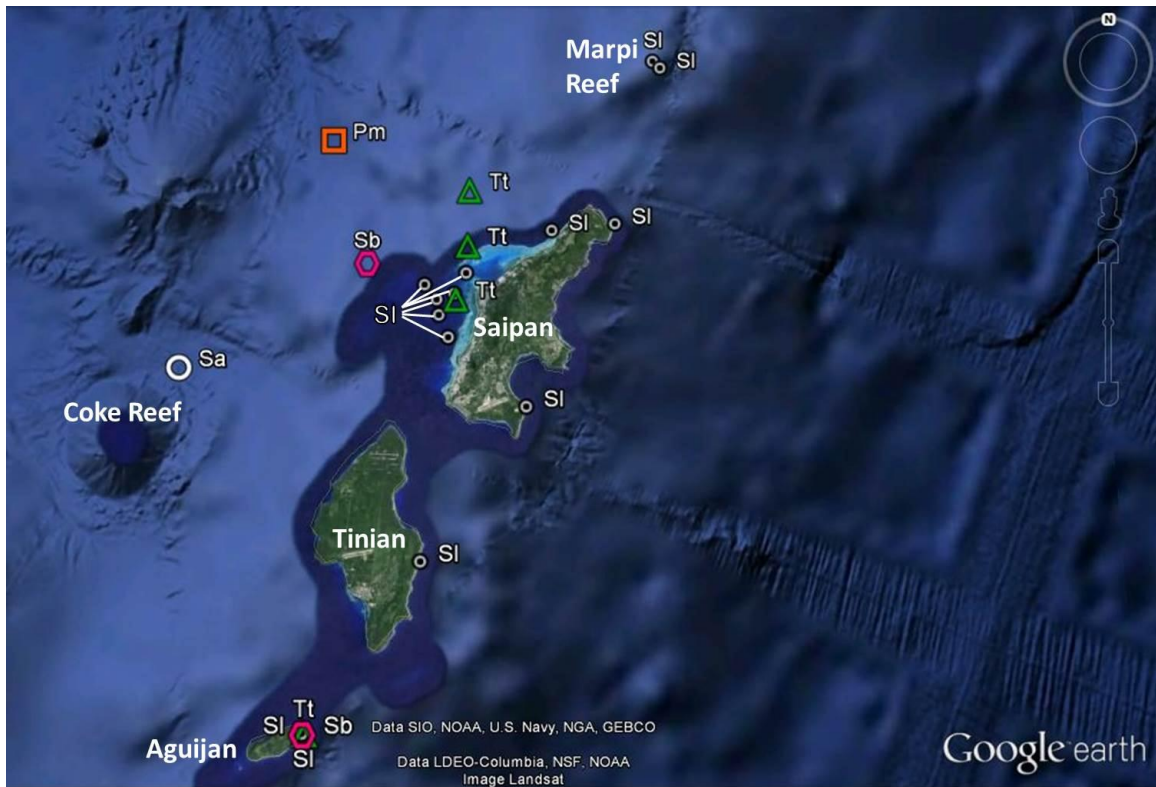


Figure 7.--Locations of cetacean encounters in the waters surrounding Saipan, Tinian, and Aguijan (12-27 July 2013). Pm-*Physeter macrocephalus* (sperm whale), Sa-*Stenella attenuata* (pantropical spotted dolphin), Sb-*Steno bredanensis* (rough-toothed dolphin), Sl-*Stenella longirostris* (spinner dolphin), Tt-*Tursiops truncatus* (bottlenose dolphin).

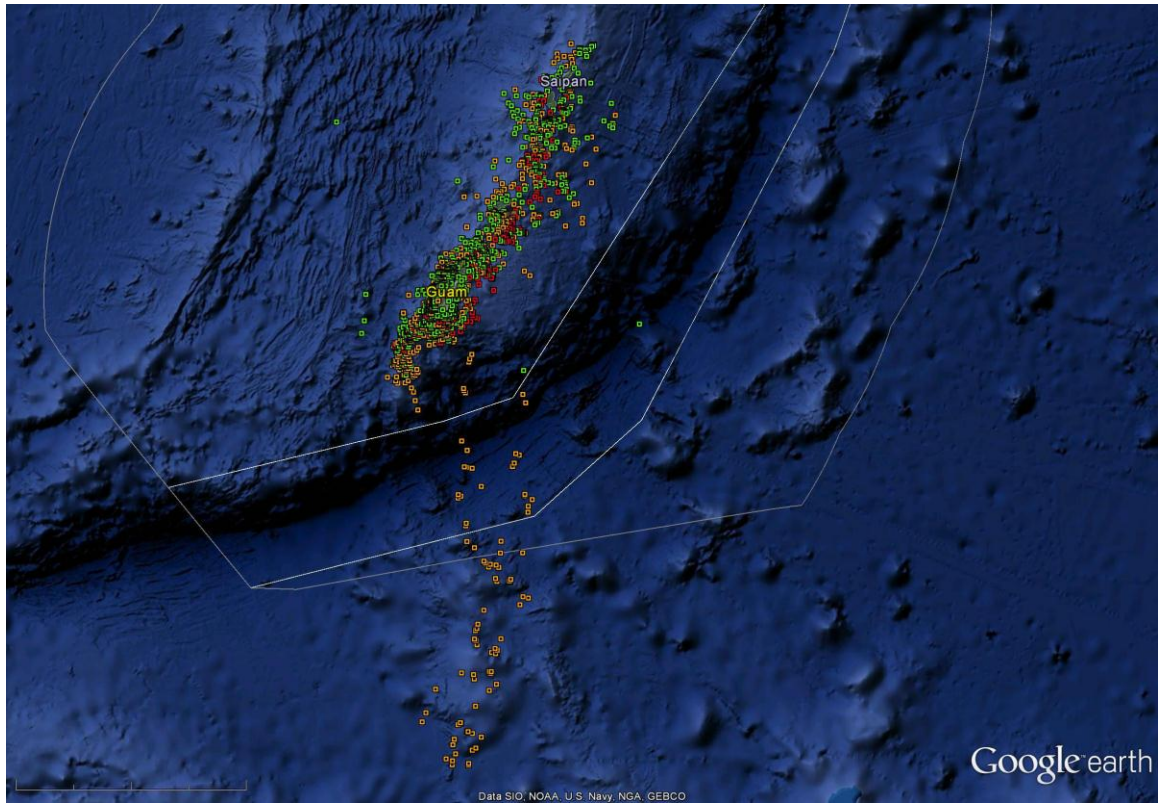


Figure 8.--Satellite transmission positions for tagged short-finned pilot whales (128884—red; 128885—orange; 128886 - green) through 12 December 2013. Tag 128886 continues to transmit after 169 days. Outer white line—Guam/CNMI EEZ; inner white lines—Mariana Trench Marine National Monument. The satellite tag positions shown are based on raw transmission data and have not been quality checked. The final products may vary from those shown.

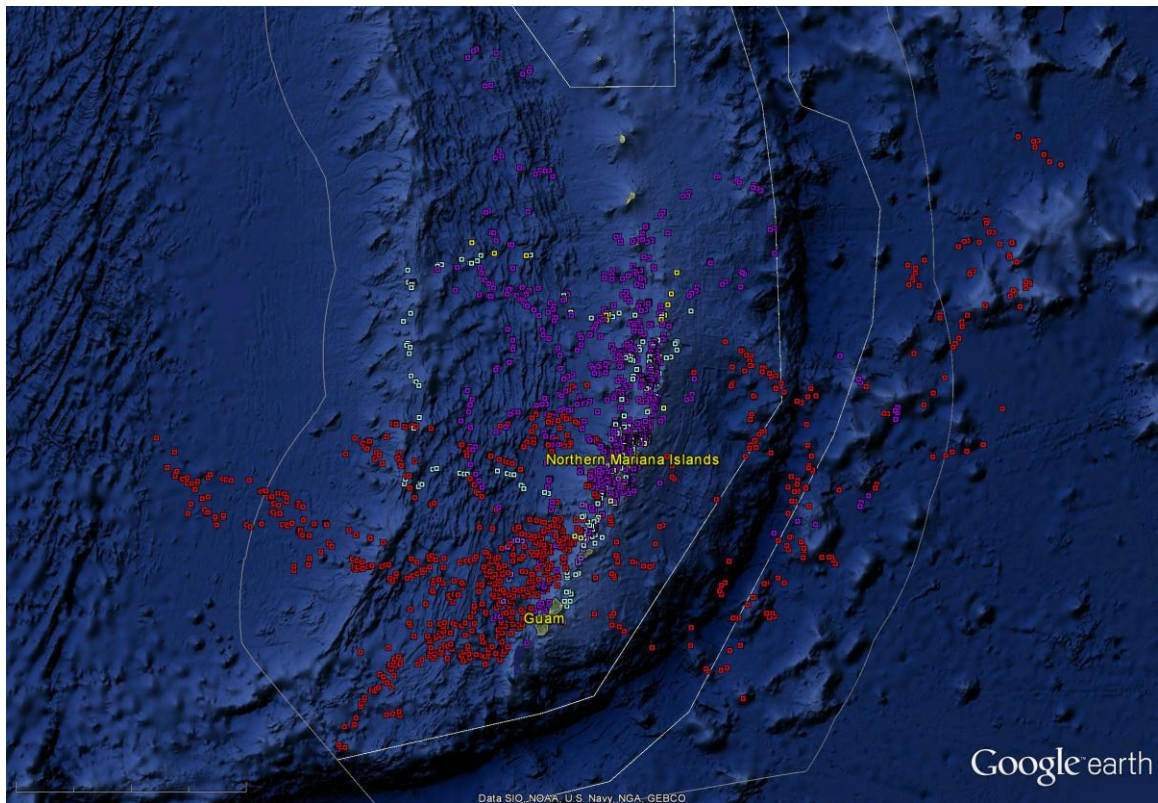


Figure 9.--Satellite transmission positions for tagged false killer whales (128903—yellow; 128904—teal; 128906 - purple; 128908—red) through 12 December 2013. Tag 128908 continues to transmit after 163 days. Outer white line—Guam/CNMI EEZ; inner white lines—Mariana Trench Marine National Monument. The satellite tag positions shown are based on raw transmission data and have not been quality checked. The final products may vary from those shown.

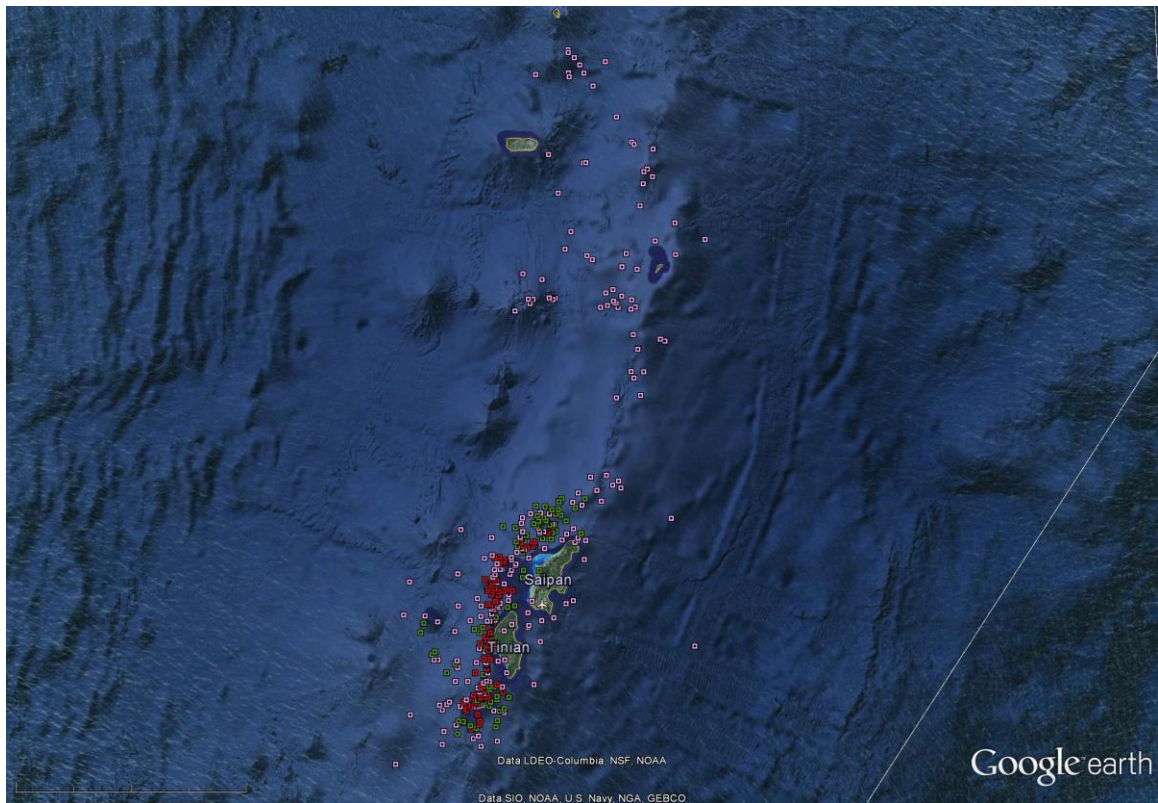


Figure 10.--Satellite transmission positions for tagged rough-toothed dolphin and bottlenose dolphins (128896—red; 128897—pink; 128898—green) through 15 August 2013. White line—Mariana Trench Marine National Monument boundary line. The satellite tag positions shown are based on raw transmission data and have not been quality checked. The final products may vary from those shown.